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ABSTRACT

Children's visual attention to, and comprehension of, a television program was measured. A total of 64 children, equally distributed by sex, with 32 in kindergarten and 32 in fifth grade, were randomly assigned to one of four treatment conditions that crossed two levels of content cues with two levels of sound effects. The content cue conditions provided 35 seconds of additional information which indicated that a dream was occurring while the no content cue conditions did not. The content cue conditions were either preceded or not preceded by one-second sound effects. Visual attention was videotaped during each child's individual viewing session. After viewing, each child answered a 22-item multiple-choice recognition test of inferential, central-concrete, and incidental content. Results demonstrated that sound effects increased attentional responsiveness and inferential recognition better than the content cues, particularly for the youngest children who have the greatest difficulty understanding televised stories. (Author/RH)

Sound Effects and Content Cues for Children's Television Story Comprehension

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Abstract

Children's visual attention to, and comprehension of, the same television program was measured. Sixty-four children, equally distributed by sex and by kindergarten and fifth grades, were randomly assigned to one of four treatment conditions that crossed two levels of content cues with two levels of sound effects. The content cue conditions provided 35 seconds of additional information which indicated that a dream was occurring while the no content cue conditions did not. The content cue conditions were either preceded or not preceded by one second sound effects. Visual attention was videotaped during each child's individual viewing session. After viewing, each child answered a 22 item multiple-choice recognition test of inferential, central-concrete, and incidental content. Results demonstrated that sound effects increased attentional responsiveness and inferential recognition better than the content cues, particularly for the youngest children who have the greatest difficulty understanding televised stories.

Sound Effects and Content Cues for Children's Television Story Comprehension

Mature comprehension of a televised story requires that viewers select significant content for processing, temporally integrate that program material, and draw inferences about implicitly presented information (Collins, Wellman, Keniston & Westby 1978). Because young children have difficulty in selecting central, plot-relevant content during viewing (Collins 1982), one step to improve television story comprehension is to guide visual attention selectively to important content.

Content per se does not reliably distinguish plot-relevant from irrelevant information, but certain auditory production techniques can highlight particular television content by eliciting attentional orienting responses from children (Calvert, Huston, Watkins & Wright 1982). This study examined whether sound effects, an auditory television production feature, can selectively guide children's visual attention to content insertions so that story comprehension is increased.

Method

Subjects

Subjects were 64 children, equally distributed by sex and by kindergarten and fifth grades, who attended a public elementary school in a moderately-sized Southern city. Children were randomly assigned within grade and sex groups to one of four treatment conditions.

Television Treatment Conditions

The television program was a 14 minute black and white, live episode of "The Little Rascals," titled "Mama's Little Pirates." The program plot was edited to create four viewing conditions by crossing two levels of content cues with two levels of sound effects before and after a dream segment. When content cues were present, 35 seconds of supplementary information was provided to show that a dream was occurring; in particular, the scene transitions surrounding the dream were edited so that the major character climbed into his bed before the dream, and after the dream, he awakened in his bed. When content cues were absent, that information was not provided. The content cue/no content cue conditions

were either preceded or not preceded by one second sound effects.

Procedure

Children were taken individually to an empty classroom in their school where they were seated by an experimenter at a table. On the table were small toys, comic books, and drawing materials for play. Across the room from them was a television monitor. Each child was told to read, play, and watch television just like at home. With remote control buttons, the experimenter activated a hidden camera which videotaped the viewing session and a videotape recorder which played one of the four edited program versions.

Visual Attention

Each child's visual orientation to the television screen was videotaped. These tapes were later scored to determine the percent of time that a child who was not looking at the television program would look back immediately after sound effects were presented. Visual attention was scored as "recruited" when a child reoriented attention back to the television screen

within 5 seconds after the sound effects occurred or during that same time frame in no sound effect conditions; visual attention was scored as "not recruited" if a child did not reorient attention back to the television screen within that 5 second time frame. Interobserver reliability was 97% using the formula 2 x the number of agreements divided by the total number of scores for both observers.

Comprehension: Multiple-Choice Recognition Scores

After viewing, each child answered 22 multiple-choice items which assessed recognition of inferential, central-concrete, and incidental program content. Central questions were plot-relevant and involved either concretely presented facts or inferences about implicitly presented character feelings and motives. Incidental questions all concerned information that was peripheral to the program plot. All items had a minimum centrality rating of 80%. There were seven inferential items, five central-concrete items, and ten incidental items.

Results

Recruit attention and inferential, central-concrete, and incidental recognition scores were analyzed, in turn, by a 2 (sound effect) by 2 (content cue) by 2 (grade) by 2 (sex) between-subjects analysis of variance.

Recruit Attention Scores

The four factor ANOVA computed on recruit attention scores yielded main effects for sound effects, $F(1,48) = 29.21$, $p < .05$, and grade, $F(1,48) = 4.86$, $p < .05$, which were qualified by a grade by sound effect interaction, $F(1,48) = 6.78$, $p < .05$. Children who heard sound effects looked back at the television program 44% of the time while children in no sound effect conditions looked back only 2% during that same time frame. Attention was recruited 31% of the time for kindergartners and 14% of the time for fifth graders. The grade by sound effect interaction revealed that the recruiting effect was positive for both grades. Kindergartners looked back at the television program 62% of the time after hearing sound effects, but they never looked back during those program points when there were

no sound effects; fifth graders looked back at the program 25% of the time after hearing sound effects, but only 3% of the time when there were no sound effects.

Multiple-Choice Recognition Scores

The four factor ANOVA on inferential recognition scores yielded main effects for grade, $F(1,48) = 91.35$, $p < .001$, and sound effects, $F(1,48) = 4.28$, $p < .05$, which were qualified by a grade by sound effect interaction, $F(1,48) = 5.14$, $p < .05$, and a grade by content cue interaction, $F(1,48) = 5.14$, $p < .05$. Fifth graders recognized 5.72 while kindergartners recognized 2.69 inferential items. Children who heard sound effects recognized 4.53 while those who did not hear sound effects recognized 3.88 inferential items. As seen in Figure 1, the grade by sound effect interaction revealed that sound effects increased

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Insert Figure 1 about here

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kindergartners' inferential recognition while fifth graders performed equally well in both conditions. The

grade by content cue interaction revealed that kindergartners recognized inferential content better without content cues (mean = 3.25) than with content cues (mean = 2.13) while fifth graders recognized inferential content equally well without content cues (mean = 5.76) and with content cues (mean = 5.88).

The four factor ANOVA on central-concrete recognition scores yielded a main effect for grade, $F(1,48) = 31.50$, $p < .001$, and a sex by sound effect interaction, $F(1,48) = 5.79$, $p < .05$. Fifth graders recognized 4.53 while kindergartners recognized 3.22 central-concrete items. Boys in no sound effect conditions (mean = 4.25) recognized more central-concrete content than did girls in no sound effect conditions (mean = 3.44) whereas boys (mean = 3.75) and girls (mean = 4.06) in sound effect conditions did not differ from other conditions.

The four factor ANOVA on incidental recognition scores yielded only a main effect for grade, $F(1,48) = 12.80$, $p < .001$. Fifth graders recognized 6.50 while kindergartners recognized 5.06 incidental items.

Discussion

By highlighting particular content, formal features like sound effects can recruit children's attention and improve comprehension of central, plot-relevant material. More specifically, sound effects produced a primitive attentional orienting response from viewers which, in turn, influenced what they understood. Sound effects increased visual attention and inferential recognition for kindergartners and central-concrete recognition for girls, but had no effect on recognition of irrelevant, incidental content. The consistency in the direction of effects is striking because the sound effects lasted 3 seconds total. By contrast, content cues negatively affected kindergartner's inferential recognition.

This research supports the idea that children use formal features to actively process television content (Wright & Huston 1983). Producers of children's television programs should systematically pair salient formal features like sound effects with important televised information to maximize children's memory for central, plot-relevant content.

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Figure 1. DEVELOPMENTAL DIFFERENCES IN MEAN NUMBER OF INFERENTIAL ITEMS CORRECT AS A FUNCTION OF SOUND EFFECTS